REMARKS

Claims 1-16 and 19-29 are pending in Application. Claims 1-16 and 19-29 stand rejected. Claims 1, 4, 12, and 19 are being amended. No new matter is believed to be introduced by way of the amendments.

Rejections Under 35 U.S.C. §103(a)

Claims 1-4 and 10-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Uzun *et al.* (U.S. Patent No. 6,961,342, hereinafter referenced to as "Uzun") in view of Reeve *et al.* (U.S. Patent Application Publication No. US 2002/0027902, hereinafter referenced to as "Reeve").

Claim 1 is now amended. Support for this amendment can be found in the Application, as originally filled, at least on page 35, lines 4-16, page 36, lines 14-22, and in Fig. 26.

Applicants' amended Claim 1 relates to a packet switch for switching packets between traffic sources and traffic sinks. The switch includes plural input and output sectors. Each input sector includes at least one queue per output sector. Each input sector also includes plural input ports with each input port arranged to receive packets from respective traffic sources. Each output sector includes plural output ports and is arranged to hold at least one queue per output port. The input sectors are connected to the output sectors via links (*e.g.*, optical links) and are configured to afford speed-up of data transfer. The optical links are connected to plural optical switches and are switchable so that they can carry packets from a respective input sector to any of the plural output sectors. The connections of the optical links connecting the input and output sectors are fixed according to a traffic matrix. The traffic matrix includes elements that specify the time-average required capacity between each traffic source-traffic sink pair. The packet switch includes a circuitry that controls the plural optical switches to vary the resulting connections of the set of links in accordance with variations in the time-average capacity.

Referring to Applicants' Fig. 26, input sectors 200-203 and output sectors 204-207 are connected using links in an optical interconnection network of optical switches 210-217. Each optical switch has the functionality of a crossbar and is thus capable of connecting any one of its inputs to any one of its outputs. In the example shown in Fig. 26, eight optical switches are used.

Each optical switch may have four inputs and four outputs. A network of optical links may be used to connect the four input sectors to corresponding inputs on each of the eight optical switches. Similarly, a second network of optical links may be used to connect the outputs of each of the eight optical switches to corresponding output sectors.

Given that the input sectors each have more output paths than inputs, this arrangement results in a speed up in the system. A suitable scheduling algorithm can therefore ensure congestion-free operation for any non-stationary admissible traffic matrix. Sectorizing at the input also helps in reducing overall complexity of the system. Specifically, sectorizing ensures that each input sector can at least have one path to each output sector without contention or the need to switch path. In absence of sectorizing, there would be a need to have four links per input to avoid contention. These links would likely be lightly loaded at times while others maybe completely overloaded. The links connecting the input and output sectors may remain fixed for long periods of time and only be reconfigured after a change in traffic pattern occurs.

In contrast, Uzun employs a round robin scheduling technique that results in varying the link connections during in each time slot to avoid speedup. As described in column 12, lines 6-30, Uzun employs scheduling techniques that use link sharing and round robin prioritized output link reservation (see column 12, lines 6-30). The round robin scheduling algorithm along with link sharing resolves output contention and eliminates speedup in the central switch fabric (see column 12, lines 37-41). Round robin algorithms are known to assign time slots to each link in equal and circular order so that they can handle all links without priority.

Accordingly, Uzun employs a round robin scheduling technique that results in varying the link connections during each time slot to avoid speedup. Uzun does not teach or suggest "the set of optical links resulting in fixed connections between the input and output sectors according to a traffic matrix that includes elements that specify the time-average required capacity between each traffic source – traffic sink pair, wherein the switch includes a circuitry for controlling the plural optical switches to vary the resulting connections of the set of links in accordance with variations in the time-average capacity and not at a time slot rate," as required by Applicants' Claim 1.

Reeve relates to a traffic management system for use in a terabit router that meets the requirements of IP traffic. In operation, packets having variable lengths are sent in fixed length

cells across a cross-bar switch (see paragraph [0004]). A packet switch then receives the packets and transfers the packet to an output port. In order to control the rate at which data must be transmitted, Reeves employs a matrix, R, that represents the rate per unit time. The matrix R is arranged such that its elements $r_{j,k}$ represent the rate from an ingress forwarder j to a corresponding egress forwarder k (see paragraph [0057]). As explained in paragraph [0058] of Reeves, this rate is "independent of any traffic conditions prevailing at the time."

However, in contrast to Applicants' Claim 1, Reeve offers no suggestion of "traffic matrix that includes elements that specify the time-average required capacity between each traffic source – traffic sink pair." The matrix, R, described in Reeves is merely a rate matrix with elements that are independent of traffic conditions. Additionally, Reeve schedules transmission of packets in time slots and offers no suggestion of "the set of optical links resulting in fixed connections between the input and output sectors according to a traffic matrix," as required by Applicants' Claim 1.

A hypothetical system combining the teachings of Uzun and Reeve may include links but it would not include a set of optical links that have fixed connections determined according to a traffic matrix. Such a system would employ a round robin scheme that would result in varying the links in each time slot. Such a system would not include "a circuitry for controlling the plural optical switches to vary the resulting connections of the set of links in accordance with variations in the time-average capacity and not at a time slot rate," as required by Applicants' Claim 1.

One of ordinary skill in the art would not be motivated to modify the hypothetical system to arrive at Applicants' claimed invention because the hypothetical system teaches away from the claimed invention. Specifically, while the hypothetical system would employ a round robin algorithm that results in varying the links in each time slot, the claimed invention employs link connections that are fixed according to a traffic matrix and are varied "in accordance with variations in the time-average capacity and not at a time slot rate."

Therefore, it is Applicants' position that Claim 1 is allowable over Uzun in view of Reeve. Accordingly, Applicants respectfully request that the rejection of this claim under 35 U.S.C. § 103(a) be withdrawn.

Independent Claims 4 and 12 are being amended to include similar elements as Claim 1. Accordingly, Applicants respectfully request that the rejection of these claims under 35 U.S.C. §103(a) be withdrawn for the reasons presented above.

Since Claims 2-3, 10-11, and 13-15 depend from independent Claims 1, 4, and 12, Applicants respectfully request that these dependent claims be allowed for at least the same reasons as the base claim from which they depend.

Claims 19-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Uzun in view of Miles *et al.* (U.S. Patent No. 6,665,495, hereinafter referenced to as "Miles") and further in view of Reeve.

Independent Claim 19 is being amended to include similar elements as Claim 1. As described above, Uzun and Reeve, independently or combined, fail to teach or suggest requisite elements recited in Claim 19. These deficiencies of Uzun and Reeve are not cured by Miles. Accordingly, Applicants respectfully request that the rejection of Claim 19 under 35 U.S.C. §103(a) be withdrawn for the reasons presented above. Claims 20-27 and 29, which depend from base claim 19, are also allowable for at least the same reasons as amended claim 19. Reconsideration of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claims 5-9 were rejected under 35 U.S.C. §103(a) as being unpatentable over Uzun in view of Reeve and further in view of Krishna *et al.* (U.S. Patent Application Publication No. US 2001/0050916, hereinafter referenced to as "Krishna").

Claim 16 was rejected under 35 U.S.C. §103(a) as being unpatentable over Uzun in view of Reeve and further in view of Miles.

Claim 28 was rejected under 35 U.S.C. §103(a) as being unpatentable over Uzun in view of Miles and Reeve and further in view of Carvey *et al.* (U.S. Patent No. 6,934,471, hereinafter referenced to as "Carvey").

These rejected claims are dependent from base Claims 4, 12, and 19. As explained in the previous section, Uzun and Reeve, independently or combined, fail to teach or suggest requisite elements recited in Applicants' base claims. These limitations of Uzun and Reeves are not cured by Krishna, Miles, or Carvey. Therefore, it is Applicants' position that these claims are allowable over Uzun and Reeve alone or in view of Krishna, Miles, or Carvey. Accordingly,

Applicants respectfully request that the 35 U.S.C. § 103(a) rejection of these claims be withdrawn.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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